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Examiners' Report

June 2011

GCE Design & Technology: Food 6FT02 01

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Introduction

The theoretical aspects of Food Technology involve a wide range of subject matter particularly in areas of applied science, technology and commerce, as well as an understanding of food in all respects. It is, therefore, essential that a particular aspect is addressed in an answer in an accurate manner. For example, question 7(a) on canning asked about the requirements to achieve sterility in a canned product, it did not ask for details of the canning process. As always candidates must, therefore, read the question carefully and not just react to key words like 'canned food product'. Similarly, it is essential to use the correct terminology, abbreviations and symbols. For example, the term for acidity 'pH' is widely miss-represented as ph, Ph or PH. There are also a number of misconceptions of unknown origin. For example, many candidates think that in the canning process food is firstly sterilised by heating then sealed in a can. In reality, food is prepared, sealed in a can then heat sterilised. There are also a number of common terms that are not spelt correctly, e.g. xanthan gum often is spelt as 'xantham'. Successful candidates know these points and they are an indicator that the candidate knows what he or she is talking about. There were some good answers carefully addressing the specific aspects of the answer. Less successful candidates tended to generalise and react to the main key words. Candidates who did not perform well had little knowledge of technical aspects. As in previous years candidates who used extra sheets, or deliberately went outside the given space, gained few or no extra marks. Candidates should be advised that there is sufficient space given for each answer and not to write too large.

Question 1 (b)

This question is concerned with modern methods of food production and harvesting.

(b) Give **two** reasons why contamination of raw food materials may be on the increase.

- (2)
1. ~~Answer~~ The ^{increase} use of mechanised machinery ^{means} that items such as bolts, screws...
 2. The increase in food ^{means} that more chemicals are being used, these chemicals can contaminate the raw materials if not washed ^{properly}.

(c) Outline the flotation washing process.



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Examiner Comments

This answer covers modern food production with the use of machinery and chemical pest control.

Question 1 (c)

Specific details are required on the wet cleaning process which relies on a difference in buoyancy between the food material and the contaminants such as soil.

(c) Outline the flotation washing process.

* and the dirt / contaminants falls to the bottom

The dirty product e.g. potatoes are put into a tank of water with a baffle present, this will move the product in the water so that dirt is removed, the clean product then floats to the surface and is ~~is~~ moved into another tank and the process is repeated again. The clean product is then cleaned a last time and removed ~~from~~ via a bucket conveyor ~~to~~ to be dried. (see below)

Total for Question 1 = 8 marks



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Examiner Comments

This candidate has accurately described the process of flotation cleaning. The answer deserves full marks, although buoyancy has not been mentioned.



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Examiner Tip

This is an example of a question which must be read carefully as it requires a specific response.

Question 2 (b)

There are two main tests for reducing sugars, Fehlings and Benedicts. Both require heating with sugar to produce a brick red precipitate. The fact that reducing sugars are involved in browning reactions is not a test for a reducing sugar.

(b) Outline how a reducing sugar is determined.

(3)

a Reducing Sugar is a Sugar which will reduce benedict's Reagent ~~for~~ benedict's Reagent is added to the food in a liquid state and if a Reducing Sugar is present the solution ~~will~~ turn a brick red colour, if no Reducing Sugar, the solution will stay blue



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Examiner Comments

This answer omits one crucial part in that the sugar must be heated with the solution and so loses one mark.

Question 2 (c)

Caramelisation involves heating sugars above their melting points. It occurs in the absence of protein material and therefore is not the Maillard reaction or involving enzymes.

(c) Explain what is meant by the term 'caramelisation'.

(3)

Caramelisation is a browning reaction which happens to sugars. Caramelisation takes place when sugars are heated to high temperatures, once the sugar is heated brown coloured compounds form, giving caramel its brown colour. Caramelisation occurs most readily in the absence of water.



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Examiner Comments

This answer has the basic information of heating to high temperatures and brown compounds formed.

Question 3 (a)

This question was well answered and it has many answers from general topics like gums to specific substances such as xanthan gum.

Question 3 (b)

It was surprising that many candidates did not know the basics of jam-making, particularly commenting on the amount of pectin and sugar and the right pH range.

(b) Outline **three** requirements which ensure that a firm jam can be achieved. (3)

1. pH of 3.5
2. 65 - 68% sugar
3. High ~~pH~~ High molecular weight of pectin



ResultsPlus Examiner Comments

This is a good answer quoting the correct pH and sugar level. It also goes further in correctly stating that high molecular weight pectin is required.



ResultsPlus Examiner Tip

It pays to give as much technical detail as possible in a question like this.

Question 3 (c)

Xanthan gum has many properties. Candidates tended to know about the thixotropic nature of the gum in sauces, but were less sure about its use in canned food.

(c) Explain the use of xanthan gum in the following **two** products.

(4)

Sauces xanthan gum keeps the sauces thixotropic. This means that when the sauces is still it is thick. However, when it is agitated it ~~becomes~~ becomes runny.

Canned foods when xanthan gums are mixed with can fillings it makes them runny. This is easier to place in the cans. This is also better when heating as heat conducts better through liquid. As the can travels along the production line the food ~~becomes thicker + more used~~ ^(Total for Question 3 = 10 marks) to xanthan gum.



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Examiner Comments

The main aspects are covered, and rarely the candidate mentions the better heat penetration in canning.

Question 4 (a)

This question covers those areas which influence the growth of micro-organisms and hence food spoilage. There was some confusion with the general handling and storage of food in the kitchen environment.

4 (a) Give **four** factors that can result in food spoilage.

(4)

- 1 Poor storage conditions e.g milk at ambient temperature not in the fridge
- 2 Contact with a contaminated food
- 3 High levels of microorganisms present
- 4 High temperature not optimal of 37°C lots of bacteria divide.



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Examiner Comments

This was awarded most marks, but the comment on high temperature was almost repeating the first on poor storage conditions.



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Examiner Tip

Remember to consider the overall principles of food spoilage and not individual situations in the kitchen.

Question 4 (b)

This question was answered well and most candidates gave a good range of answers which included both preventing and retarding the growth of spoilage organisms.

* (b) Give **three** food preservation processes and explain how each one prevents or retards the growth of food spoilage organisms. ^{pickling} ^{freezing-dormant} ^{drying} (6)

- 1 Drying - by extracting the water from a product it ~~removes~~ removes one of the requirements for bacteria to reproduce. Therefore foods such as dried fruit's shelf life is extended.
- 2 Freezing - this causes the bacteria to become dormant, this means that bacteria is unable to reproduce at such low temperatures. It ~~extends~~ extends the shelf of food on a further few months.
- 3 Pickling - the pH level of vinegar is too acidic for bacteria to grow and reproduce therefore it preserves foods like pickles for longer than fresh.



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Examiner Comments

Good range included in this answer.

Question 5

Here is an example of a question which was not properly read by candidates and consequently misinterpreted. The question asked for general principles for producing food specifications and not details of what is normally included in a specification.

*5 Discuss **five** general principles for producing food product specifications.

(10)

1. When producing food specifications, one must ensure that they are ~~achieveable~~ ^{achievable}, so that they ~~can be~~ ^{met} easily are not too hard to meet.
2. They must not cause unnecessary ~~harm~~ ^{harm} to the environment - for example, making packaging recyclable and using local/organic products.
3. They must abide to all laws, for example being within the 2000 calories a day limit.
4. They must have a target market to appeal to, so that the manufacturer knows what type of product to produce.
5. They must be wary of any specific dietary needs, like not containing milk if its lactose free, and not containing meat & fish if its for vegetarians.

(Total for Question 5 = 10 marks)



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Examiner Comments

This candidate only achieved two marks for the point about being 'achievable' and abiding by legal aspects.



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Examiner Tip

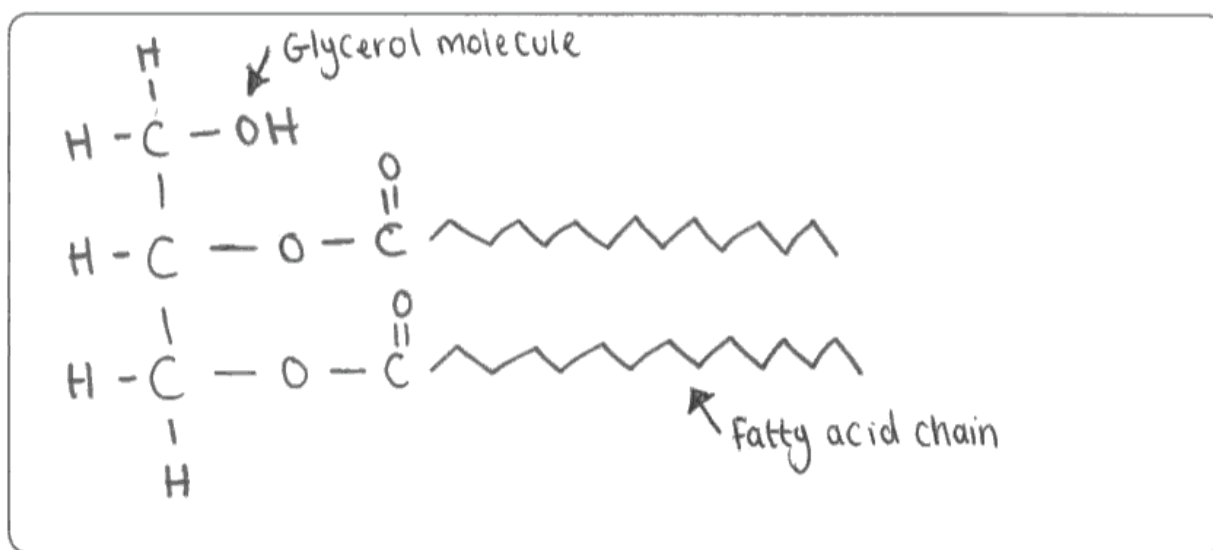
Always read the question carefully. The key words here are 'producing' and 'food product specifications'.

Question 6 (a)

A question which was well answered.

6 (a) Describe using notes and/or annotated sketches the structure of a diglyceride. (3)

A Diglyceride has one glycerol molecule and two fatty acid chains.



ResultsPlus Examiner Comments

This candidate obtained full marks by producing an accurate diagram and also showing the free -OH group which was missed by many candidates.



ResultsPlus Examiner Tip

Use clear diagrams where possible or requested, in order to obtain good marks.

Question 6 (b)

Candidates sometimes put the answers the wrong way round, but many knew what was required. Details of the nutritional aspects of these were not required.

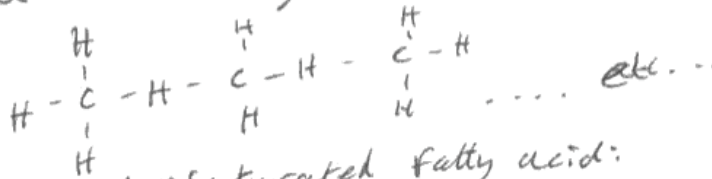
(b) Describe using notes and/or annotated sketches the chemical nature of saturated and unsaturated fatty acids.

(4)

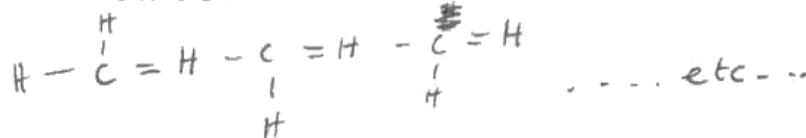
Saturated fatty acid has a full quota of hydrogen atoms (4) surrounding one carbon atom(s), therefore, ~~only~~ has single bonds.

Unsaturated fatty acid does not have a full ~~quota~~ quota of hydrogen atoms surrounding one carbon atom, this is disrupted by double bonds that have formed.

Saturated fatty acid:



unsaturated fatty acid:



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Examiner Comments

A clear answer. This is sufficient to gain full marks, although the double bonds are in the wrong places.

Question 6 (c)

This question was about essential fatty acids and, although there were some good answers, many candidates reacted to the word 'essential' and talked about 'essential amino acids' and not fatty acids.

(c) Discuss the importance of essential fatty acids in the diet.

(5)

Fatty acids are essential in the diet to ensure the development of cell membranes and hormones. Some fatty acids cannot be synthesised in the body therefore they need to be provided. Examples of essential fatty acids include omega 3 and omega 6. Essential fatty acids are also important to the diet because they can aid blood clotting, regulate blood pressure and ensure efficient development of the spinal cord. They can also help prevent heart disease. As a result essential fatty acids are very important to the diet.



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Examiner Comments

This candidate made a reasonable attempt gaining 4 marks for commenting: essential in the diet, and cannot be synthesised; development of cell membranes; hormones; and aiding blood clotting.



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Examiner Tip

Candidates should check they are discussing the right 'essential' group of substances.

Question 7 (a)

The details of the canning process itself were not required but the factors which are involved in achieving sterility were requested. Many students detailed the canning process and preliminary operations.

*7 (a) Discuss the requirements which must be considered to achieve sterility in a canned food product.

(6)

~~A food must be~~ Aseptic canning can ensure the sterility of ~~a~~ the food. This is where the food is sterilised, the can is sterilised and the food is put into the can in sterile conditions. Although usually the best way is ~~to~~ to sterilise the can, put the food and any liquids in and ensure that when the lid is put on all the air is removed, this ensures that any aerobic bacteria cannot multiply. After the food is canned it will then be brought to 121°C, to ensure even the middle of the product is reached, ~~for 1 to 2 minutes~~ so the food is safe and doesn't over cook. The time heated will change due to the product as heat travels faster through liquid due to convection. The manufacturers will randomly select a sample of the batch to ensure its safety.



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Examiner Comments

This candidate achieved half marks by discussing temperatures and heat penetration to the centre of the can.

Question 7 (b)

The differences between the two heat processes of pasteurisation and sterilisation were requested. Most candidates knew the differences but there were wide variations on actual details and temperatures and times involved.

(b) Explain the differences between the heat processes of pasteurisation and sterilisation.

(6)

pasteurisation is mainly the heat of milk and it works around the temperatures of 72°C for 20-30 seconds. However sterilisation is at a much higher temperature of around 135°C for a longer period of time. pasteurisation does not achieve full sterility meaning all bacteria is not killed. Foods such as tinned and canned foods are sterilised whereas pasteurisation is mainly milk. Sterilisation does achieve full sterility for example in a container of sweets etc.



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Examiner Comments

This candidate indicated the differences between the intensities of the processes and their effects on the bacterial population.

Paper Summary

As always, candidates should read the questions carefully and not react to the main key words. Successful candidates will produce technically accurate answers with the correct terminology. In revising for the exam candidates should not try to spot questions but obviously there will not be repeat questions from the previous year. Candidates should always write in the given area, and there is plenty of space for a correct answer. Candidates should always notice the mark allocation for each part of the question and spend an appropriate time in answering it.

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